Saskatchewan Agriculture and Food

# FARM *FACTS*

## Mustard Crop Establishment

### Introduction

In Canada, commercial production of mustard began with 40 hectares planted in southern Alberta in 1936. Since its introduction, the crop has become a valuable option in the brown and dry brown soil zones. Saskatchewan producers have become the world's largest exporters of mustard.

### Mustard Types

Three mustard types, derived from two different species, are grown in Saskatchewan.

***Yellow Mustard (Sinapis alba)***

The major market for yellow mustard is the North American condiment industry where uses include traditional hot dog mustard, mayonnaise and salad dressings. Yellow mustard is also a water-binding agent in prepared meats.

***Brown Mustard (Brassica juncea)***

Europe is the primary market for brown mustard. The major use is as a condiment.

***Oriental Mustard (Brassica juncea)***

Asia is the primary market for oriental mustard where it is used as cooking oil and as a condiment.

*Pods of yellow mustard nearing maturity.*

### The Importance of a Good Start

As with any crop, success relies on the production and farming practices of previous years. A proper long-term crop rotation will ensure the soil is being adequately prepared for specific crops. Mustard seed is very small and young seedlings require assistance to advance from germination through to the three- and four-leaf stages. This period is critical in determining final yield.

### The Importance of Uniformity

In mustard production, uniformity is key to success. A uniform crop has more potential to withstand weed, insect and disease pressure, while a non-uniform crop is difficult to gauge for pesticide application, swathing and crop dry-down. Crop rotation, residue management, seedbed preparation, seeding date, seeding rate and fertility are crucial to uniform crop establishment.

## Crop Rotation

Crop rotation, which affects insect, weed and disease pressure, is an important part of any production system. Disease control, moisture management and admixtures are three important considerations with respect to mustard in a crop rotation.

### *Disease Control*

Pay particular attention to crop residue; mustard is susceptible to sclerotinia, which affects canola and field peas. The general rotational rule of thumb for sclerotinia control in canola is one canola crop in four years. However, the disease does not present as high of a production risk in mustard growing areas. If sclerotinia has been a problem in the past, limit the frequency of susceptible crops in the rotation.

### *Moisture Management*

Mustard is traditionally grown in the brown and dry brown soil zones of Saskatchewan where moisture is often the limiting production factor. The major effect crop rotation has on soil moisture, by rotating between deep- and shallow-rooted crops, is the efficient use of available water. Shallow-rooted crops perform well after deep-rooted crops, because moisture recharge occurs first near the soil surface. Consequently, deep-rooted crops prefer following shallow-roots because they can take advantage of unused moisture deep in the soil profile.

**Table 1.** Relative rooting depth of various crops

| Deep | Moderate | Shallow |
|---|---|---|
| Alfalfa | Barley | Field Pea |
| Sunflower | Canola | Flax |
| | Mustard | Lentil |
| | Wheat | |

### *Admixtures*

Consider admixtures of weeds and volunteer crops, which can affect mustard quality, as part of your rotation. (See Table 2. below)

## Residue Management

Mustard is a very small-seeded crop and requires assistance to uniformly reach the true-leaf stage. Proper residue management of the preceding crop is essential. Uneven residue distribution means soil warms unevenly and subtle changes in soil temperature may result in patchy germination. In addition, residue conserves moisture; areas with less trash may dry out faster, resulting in patchy germination.

## Variety Selection

Consider several factors when selecting a mustard variety. Within each class, little variation exists for maturity, seed weight, chlorophyll, plant height or blackleg tolerance.

### *Certified Seed*

Mustard buyers, processors and consumers are quality conscious. The Canadian Grain Commission determines the specifications for number one mustard seed and these specifications determine the level of weed seeds, volunteers and other classes of mustard. Using certified seed ensures that the crop you plant has a good opportunity to achieve a number one, high quality product. Using certified seed will also decrease the chance of introducing new diseases and weeds to previously unaffected fields.

## Seedbed Preparation

A mustard seedbed should be firm, moist and uniform. A firm seedbed allows good seed-to-soil contact, even planting depth and quick moisture absorption leading to uniform germination. Seedbed preparation depends on the production system.

### *Conventional Tillage*

With conventional tillage systems, pay particular attention to moisture management. Complete the first tillage operation in the fall or in the spring; bury, mix or leave trash relatively undisturbed. Generally, complete a second tillage operation before

**Table 2.** Maximum limits of conspicuous admixture for primary and export grade mustard (per cent)

| Grade | Sclerotinia | Cow Cockle | Wild Mustard | Canola | Other Classes |
|---|---|---|---|---|---|
| No. 1 Canada | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 |
| No. 2 Canada | 0.2 | 0.2 | 0.2 | 0.2 | 2.0 |
| No. 3 Canada | 0.3 | 0.3 | 0.3 | 0.3 | 5.0 |

Source: Canadian Grain Commission

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**Table 3.** Mustard variety characteristics (1998 – 2000)

| Type and Variety | Yield[1] | Maturity[2] | Seed Weight[3] | Chlor.[4] | Height[5] | Blackleg[6] | White Rust[7] |
|---|---|---|---|---|---|---|---|
| ***Oriental*** | | | | | | | |
| Cutlass | 100 | 94 | 2.8 | 2.5 | 122 | 0.2 | 14 |
| Forge | 100 | 96 | 2.5 | 2.3 | 125 | 0.2 | 100 |
| Lethbridge 22A | 95 | 94 | 2.9 | 2.1 | 134 | 0.2 | 97 |
| AC Vulcan | 100 | 95 | 2.8 | 2.5 | 120 | 0.2 | 10 |
| ***Brown*** | | | | | | | |
| C. Brown | 92 | 95 | 2.6 | 5.8 | 117 | 0.2 | 100 |
| ***Yellow*** | | | | | | | |
| Ochre | 100 | 95 | 5.5 | 1.7 | 110 | 0.1 | 83 |
| AC Base | 108 | 94 | 5.7 | 1.7 | 110 | 0.1 | 82 |
| AC Pennant | 108 | 94 | 5.6 | 1.4 | 108 | 0.1 | 96 |
| Tilney | 103 | 94 | 5.5 | 1.5 | 108 | 0.2 | 85 |
| Viscount | 98 | 96 | 5.0 | 1.7 | 115 | 0.2 | 88 |

[1]Yield: percent of Cutlass for Oriental and Brown, percent of Ochre for Yellow
[2]Maturity: days from planting to physiological maturity
[3]Seed Weight: grams/1000 seeds
[4]Chlorophyll: mg/kg
[5]Height: cm
[6]Blackleg: severity between zero and five. Zero is resistant, five is completely susceptible.
[7]White Rust: percent incidence of white rust strain 2a.
Source: Agriculture and Agri-Food Canada Co-operative Mustard Report 2000

seeding to evenly distribute the trash and to reduce the size of lumps. Pack during the second tillage to reduce lump size, conserve moisture and create a firm seedbed.

### *Minimum or Zero Tillage*

Success with minimum or zero tillage requires even distribution of crop residue, since no opportunity to spread trash exists with a tillage operation. Spread residue the width of the swath when harvesting, but if that is not possible, harrow in the fall when the straw is dry. Following a well-designed crop rotation and evenly distributing residue will create a firm, moist and uniform seedbed.

## Seeding Date

Planting mustard early will allow the crop to mature before the hottest part of the year. Field experiments in southwest Saskatchewan show the benefit of planting all types of mustard early. The test did not include brown mustard, however, performance of oriental mustard is a good indicator of the performance of brown mustard under similar conditions.

## Seeding Rate

The seeding rate for brown and oriental mustard is 1.8 to 2.7 kg/ha (4 to 6 lbs/ac) and for yellow mustard 3.7 to 4.5 kg/ha (7 to 10 lbs/ac). Mustard can compensate for low seeding rates with increased branching; however, low plant densities will increase the time to maturity and make the crop more susceptible to the effects of insect, weed and disease pressure.

**Table 4.** Mustard yield in response to seeding date in southwest Saskatchewan (1994 – 1997)

| | Yield (% of May 10 – 15 seeding date) | | |
|---|---|---|---|
| | Apr 28 – May 6 | May 10 – May 15 | May 22 – May 31 |
| Yellow mustard | 123 | 100 | 84 |
| Oriental mustard | 101 | 100 | 80 |

Source: Agriculture and Agri-Food Canada Research Branch

## Seeding Depth

Seeding depth is dependent on soil moisture regardless of mustard type. If conditions are moist, plant seed 12 to 25 mm (1/2 to 1 inch) deep. If the soil is dry, three options exist: seed deeper into moisture, seed into dry soil and wait for rain or delay seeding. If the soil temperature is high enough to encourage fast germination and quick growth, seeding deeper may be an option. If the soil temperature is below 10°C, do not seed deeper that 25 mm (1 inch). Do not seed mustard deeper than 37 to 50 mm (1 ½ to 2 in) deep. Seeding into dry soil or delaying seeding is an option, but consider the benefits of early versus late seeding.

## Notes:

1. Due to similarities, canola serves as a model for some recommendations.
2. Where alternative data was not available, brown and oriental mustard recommendations are equivalent to one another because they are the same species.

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